LANDS AND FORESTS
TECHNICAL NOTE

FEEDING INHIBITION OF *HYLOBIUS CONGENER* BY PRUNING SPRAY

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INTRODUCTION

In Europe *Hylobius abietis* L. and in eastern United States *H. pales* are two species of debarking weevils that cause significant mortality of small seedlings planted in recently harvested and site-prepared cutovers. Presently, the only way to protect the crop is to delay planting on such high risk sites for a minimum of two years. Until recently the northeastern region of North America has been spared weevil plantation problems. In 1983 seedling mortality was noted in three plantations in Antigonish County. At the same time, trees in a Provincial nursery and a private nursery were being attacked by adult strawberry root weevil (*Otiorbynchus ovatus* (L.)) and the black vine weevil (*Otiorbynchus sulcatus* (F.)) respectively.

The occurrence of *O. ovatus* and *O. sulcatus* in the nurseries and the receipt of a Plantation Pest Notice from the State of Maine (Appendix 1) prompted a re-examination of the affected plantations in Antigonish County (Table 1).

The species of greatest abundance was *H. congener* D.T. (90%) then *O. ovatus* (5%) and the other species totaled five percent. Presently, the other species of weevils are considered to be transients. However, both *O. sulcatus* and *H. radicus* have the potential to cause significant damage in conifer plantations.

During 1984 a debarking weevil working group was formed among Provincial, Federal and State agencies involved with *H. congener*. Its objectives are:

1. elucidate the life cycle of *H. congener*,
2. develop a kairmone (food odour) trapping system to monitor *H. congener*,
3. develop a site hazard index for new plantations,
4. develop control principles and techniques for use against *H. congener*:
   a. mechanical barriers,
   b. site preparation techniques,
   c. chemical controls,
   d. pheromone control.

Foraging insects are repelled by mechanical and/or chemical barriers. This Technical Note is a brief description of a preliminary field trial to examine the effectiveness of an asphalt tree wound dressing paint as a mechanical barrier against feeding adults of *H. congener* and to determine if further research would be warranted on this approach.

Table 1. *Species list of weevils found in a damaged spruce plantation Antigonish County, Nova Scotia, Canada. 1983.*

Common Name	Scienfitic Name	Abundance %
debarking weevil	*Hylobius congener* D.T.	90
Coupar's collar weevil	*Hylobius pinicola* Coupar	1
pine root collar weevil	*Hylobius radicis* Buch.	1
Warren's root collar weevil	*Hylobius warreni* Wood	1
strawberry root weevil	*Otiorbynchus ovatus* (Linn.)	5
black vine weevil	*Otiorbynchus sulcatus* (F.)	1
clover root weevil	*Sitona bispidulus* F.	1

METHODS

The 1986 trial was divided between two areas. At St. Andrews, Antigonish County the trial was limited to 64 2-0 black spruce (*Picea mariana* (Mill.) B.S.P.) seedlings planted at 1.8 m spacing in a previously established 2-2 white spruce (*Picea glauca* (Moench) Voss) plantation. Eighty-four multipot white spruce were planted among similar stock at Granny's Road in Pictou County. The St. Andrews site was known to have moderate populations of *H. congener* whereas the Granny's Road site had the potential for *H. congener* attack.

Four to seven days before planting the basal five to seven centimetres of the seedlings were treated with CIL pruning spray to the point of dripping. The trees were planted by crews in the spring of 1986.

RESULTS

1. St. Andrews
The trees were examined on November 26, 1986 (Table 2).

Table 2. *Degree of debarking of weevil damage to treated black spruce and to untreated white spruce at St. Andrews, Antigonish County, Nova Scotia, Canada, November 26, 1986.*

Spruce Species (Stock)	Number of Trees					
	Dead	Living	Callused[1]	Hit[2]	Undamaged	Total
black (2-0)	4	(60)	3	2	55	64
white (2-2)	4	(60)	2	11	47	64

1. *callused is the healed bit area*
2. *a bit is the area of the plant eaten by an adult weevil*

2. Granny's Road
On December 3, 1986 an equal number of treated and untreated white spruce seedlings were examined at the Granny's Road site in Pictou County (Table 3). Some of the white spruce seedlings had been killed from other causes but still displayed weevil-like damage. It is possible that some mortality was caused by *O. ovatus* as a dead adult of this species was found at the root collar of a recently killed seedling. Seedling death from other causes is included in the data analysis for this site.

Table 3. *Degree of debarking of weevil damage to treated black spruce and to untreated white spruce at Granny's Road, Pictou County, Nova Scotia, Canada, December 3, 1986.*

White Spruce (2-2)	Number of Trees						
	Dead (other causes)	Dead (weevil)	Living	Callused	Hit	Undamaged	Total
treated	8	6	(70)	1	2	67	84
untreated	9	18	(57)	7	3	47	84

DISCUSSION

1. St. Andrews

The total number of trees killed from debarking weevils was the same for both black and white spruce. A chi-square test was used to assess the difference in damage to treated and untreated trees. Significantly more basal scars (hits) were noted on the untreated white spruce than were noted on the treated black spruce (Chi-square $p = 0.05$; $df = 2$). The white spruce seedlings being older and larger in stem diameter than the black spruce were less vulnerable to debarking weevils. The area debarked on the white spruce seedlings would have killed younger, smaller and/or thinner trees.

2. Granny's Road

Death from other causes is similar in both cases for both groups. The presence and feeding by other species of weevils such as *O. ovatus* and *O. sulcatus* can add to tree mortality. At the Granny's Road site treated trees were less affected by weevil damage than untreated trees (Chi-square $p = 0.05$, with $df = 4$).

SUMMARY

At both sites the treated trees were less affected by weevil attack than were untreated trees. This technique of applying a mechanical barrier to adult debarking weevils appears to have some merit. It must be stressed that the data here are preliminary and that there are a number of weaknesses in the technique such as: (1) manual method of applying the pruning spray, (2) aging of the pruning spray over time, and (3) the exposure of new bark tissue as the trees grow in circumference. This newly exposed bark can serve as a future feeding site.

The experiment is being expanded in 1987 both in Nova Scotia and New Brunswick.

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APPENDIX 1

INSECT PEST OF ARTIFICIAL REGENERATION IN MAINE

Hylobius congener, a seedling debarking weevil, has caused up to 40% mortality (during the first year) in a white pine plantation (Glenwood, Maine).

RESEARCH: Initial studies are being conducted by Dr. Mark W. Houseweart and Celeste Welty, graduate student at the University of Maine, College of Forest Resources with financial support by the Cooperative Forestry Research Unit.

STUDY AREAS: (Preliminary (1st-year) Conclusions)

SITE: Mixedwood vs Softwood — to date, no major difference in damage

AGE OF CUT: Seedlings in older cuts are less susceptible to damage

DUFF VS NO DUFF: Removal of duff from around seedling has reduced damage = 25%

SLASH: Removal or increased slash tests showed no difference, to date

LOCATION: Slightly more damage on edge plots vs center plots

TRAPPING TECHNIQUES: Best is "split bolt" (as in *Pales* weevil in southern states)

SPECIES ATTACKED: WP, RP, JP, EL, JL, BS, WS, NS, RS

TYPICAL DAMAGE: (Schematic Drawing of Seedling)

SURVIVAL FROM ATTACK: Some seedlings do survive late-season attack by forming callus tissue around the injured area.

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